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What Is Claimed Is:

1	1. A method for quantifying a number of identical consecutive digits
2	starting from a fixed position within a string of n digits, comprising:
3	converting the string of n digits into a thermometer code, wherein the
4	thermometer code uses m bits to represent a string of m identical consecutive
5	digits within the string of n digits;
6	converting the thermometer code into a one-hot code in which only one bit
7	has a logical one value; and
8	converting the one-hot code into a logarithmic code representing the
9	number of identical consecutive digits.
1	2. The method of claim 1, wherein converting the string of digits into
2	the thermometer code involves passing the string of digits through $\lceil \log_2 n \rceil$ layers
3	of AND gates, wherein a first layer of AND gates produces thermometer codes for
4	sub-strings of length two, and wherein each consecutive layer produces
5	thermometer codes for sub-strings of length $k+1$ to $2k$ by ANDing together
6	thermometer codes for sub-strings of length 1 to k from preceding layers.

- 3. The method of claim 1,
- wherein converting the thermometer code into the one-hot code involves passing the thermometer code through a single layer of two-input comparator gates;
- wherein a given comparator gate produces a logical one value when a first input of the comparator gate receives a logical one value and a second input receives a logical zero value; and

8	wherein a comparator gate is coupled between each consecutive pair of
9	thermometer code bits, so that only one comparator gate, covering a boundary
10	between consecutive logical ones and consecutive logical zeros, produces a
11	logical one value.

- The method of claim 1, wherein converting the one-hot code into 1 4. 2 the logarithmic code involves passing the one-hot code through $\lceil \log_2 n \rceil - 1$ layers of OR gates, wherein a given bit in the logarithmic code is produced by ORing 3 together bits of the one-hot code that cause the given bit in the logarithmic code to 4 5 be asserted.
- The method of claim 1, wherein the string of n digits is a string of 5. 1 2 n binary digits.
- 6. The method of claim 1, wherein the fixed position in the string of n1 2 digits is the beginning of the string, so that the number of leading identical 3 consecutive digits is quantified.
- 7. The method of claim 6, wherein the number of leading zero values 1 2 is quantified.
- The method of claim 7, further comprising using the logarithmic 8. 2 code to normalize a result of a floating-point arithmetic operation.
- 9. The method of claim 1, further comprising using the logarithmic 1 2 code to encode or decode a stream of data, wherein the logarithmic code represents a run-length of identical consecutive digits within the stream of data. 3

1	10. The method of claim 1, wherein each digit in the string of n digits
2	includes one or more binary digits.
1	11. An apparatus that quantifies a number of identical consecutive
2	digits starting from a fixed position within a string of n digits, comprising:
3	a thermometer code circuit that converts the string of n digits into a
4	thermometer code, wherein the thermometer code uses m bits to represent a string
5	of m identical consecutive digits within the string of n digits;
6	a one-hot code circuit that converts the thermometer code into a one-hot
7	code in which only one bit has a logical one value; and
8	a logarithmic code circuit that converts the one-hot code into a logarithmi
9	code representing the number of identical consecutive digits.
1	12. The apparatus of claim 11, wherein the thermometer code circuit
2	includes $\lceil \log_2 n \rceil$ layers of AND gates, wherein a first layer of AND gates produce
3	thermometer codes for sub-strings of length two, and wherein each consecutive
4	layer produces thermometer codes for sub-strings of length $k+1$ to $2k$ by ANDing
5	together thermometer codes for sub-strings of length 1 to k from preceding layers
1	13. The apparatus of claim 11,
2	wherein the one-hot-code circuit includes a single layer of two-input
3	comparator gates;
4	wherein a given comparator gate produces a logical one value when a first
5	input of the comparator gate receives a logical one value and a second input

receives a logical zero value; and

- wherein a comparator gate is coupled between each consecutive pair of thermometer code bits, so that only one comparator gate, covering a boundary between consecutive logical ones and consecutive logical zeros, produces a logical one value.
- 1 14. The apparatus of claim 11, wherein the logarithmic code circuit
 2 includes $\lceil \log_2 n \rceil$ 1 layers of OR gates, wherein a given bit in the logarithmic code
 3 is produced by ORing together bits of the one-hot code that cause the given bit in
 4 the logarithmic code to be asserted.
- 1 15. The apparatus of claim 11, wherein the string of *n* digits is a string 2 of *n* binary digits.
- 1 16. The apparatus of claim 11, wherein the fixed position in the string of *n* digits is the beginning of the string, so that the number of leading identical consecutive digits is quantified.
- 1 17. The apparatus of claim 16, wherein the apparatus quantifies the number of leading zero values.
- 1 18. The apparatus of claim 17, further comprising a floating-point 2 arithmetic unit that is configured to use the logarithmic code to normalize a result 3 of a floating-point arithmetic operation.
- 1 19. The apparatus of claim 11, further comprising an encoder that is configured to use the logarithmic code to encode or decode a stream of data,

1	wherein the logarithmic code represents a run-length of identical consecutive
2	digits within the stream of data.
1	20. The apparatus of claim 11, wherein each digit in the string of n
2	digits includes one or more binary digits.
1	21. A computer system including a circuit that quantifies a number of
2	identical consecutive digits, comprising:
3	a processor;
4	a memory;
5	a quantifying circuit that quantifies the number of identical consecutive
6	digits starting from a fixed position within a string of n digits, wherein the
7	quantifying circuit includes,
8	a thermometer code circuit that converts the string of n
9	digits into a thermometer code, wherein the thermometer code uses
10	m bits to represent a string of m identical consecutive digits within
11	the string of n digits;
12	a one-hot code circuit that converts the thermometer code
13	into a one-hot code in which only one bit has a logical one value,
14	and
15	a logarithmic code circuit that converts the one-hot code
16	into a logarithmic code representing the number of identical
17	consecutive digits.
1	22. The computer system of claim 21, further comprising:
2	a floating-point arithmetic unit of within the processor:

3	wherein the quantifying circuit is located within the Hoating-point
4	arithmetic unit and is configured to normalize results of floating-point operations.
1	23. The computer system of claim 21,
2	wherein the computer system includes an encoding circuit for encoding or
3	decoding streams of data; and
4	wherein the quantifying circuit is located within the encoding circuit and is
5	configured to quantify run-lengths of identical consecutive digits for the encoding
6	circuit.